

CLAIMS

1. An air supply system for a fuel cell comprising an air supply mechanism having an air supply chamber adapted to supply an oxygen-containing gas to a fuel cell
5 and a water supply mechanism for supplying water to said air supply mechanism to seal and cool said air supply chamber,

wherein said water supply mechanism separates water from the exhaust gas discharged from said
10 fuel cell and supplies said water to said air supply mechanism, said air supply mechanism being integrated with said water supply mechanism.

2. An air supply system for a fuel cell according to claim 1, wherein said air supply mechanism can change
15 the amount of the oxygen-containing gas per unit power.

3. An air supply system for a fuel cell according to claim 1, wherein said water supply mechanism has a liquefaction unit for liquefying the water vapor contained in the exhaust gas discharged from the fuel
20 cell to thereby produce water.

4. An air supply system for a fuel cell according to claim 3, wherein said liquefaction unit is of a centrifugal separation type and generates a turbulent flow of the exhaust gas by centrifugal force which flow
25 collides with the inner peripheral surface of said liquefaction unit thereby to liquefy the water vapor.

5. An air supply system for a fuel cell according to claim 1, wherein said water supply mechanism includes
30 a regeneration mechanism for expanding the exhaust gas discharged from said fuel cell and assisting the power to said air supply mechanism, and said regeneration mechanism includes a regeneration chamber adapted to supply the water generated by the expansion of said exhaust gas to said air supply mechanism.

35 6. An air supply system for a fuel cell according to claim 1, wherein said water supply mechanism can change the amount of water supplied.

7. An air supply system for a fuel cell according to claim 5, wherein said air supply mechanism and said regeneration mechanism are configured to operate on the same drive shaft.

5 8. An air supply system for a fuel cell according to claim 7, wherein at least one of said air supply mechanism and said regeneration mechanism is of a scroll type.

10 9. An air supply system for a fuel cell according to claim 8, wherein said air supply mechanism and said regeneration mechanism are of a scroll type; said air supply mechanism includes a housing, one surface of a side plate orbited by a drive shaft and a first spiral member protruded from said one surface; and said
15 regeneration mechanism includes said housing, the other surface of said side plate and a second spiral member protruded from said other surface.

20 10. An air supply system for a fuel cell according to claim 7, wherein at least one of said air supply mechanism and said regeneration mechanism is of a vane type.

25 11. An air supply system for a fuel cell according to claim 10, wherein said air supply mechanism and said regeneration mechanism are of a vane type; said air supply mechanism includes a housing, a first rotor rotated by a drive shaft and a first vane adapted to protrude radially from said first rotor; and said
30 regeneration mechanism includes said housing, a second rotor rotating on the same axis as said first rotor and a second vane adapted to protrude radially from said second rotor.